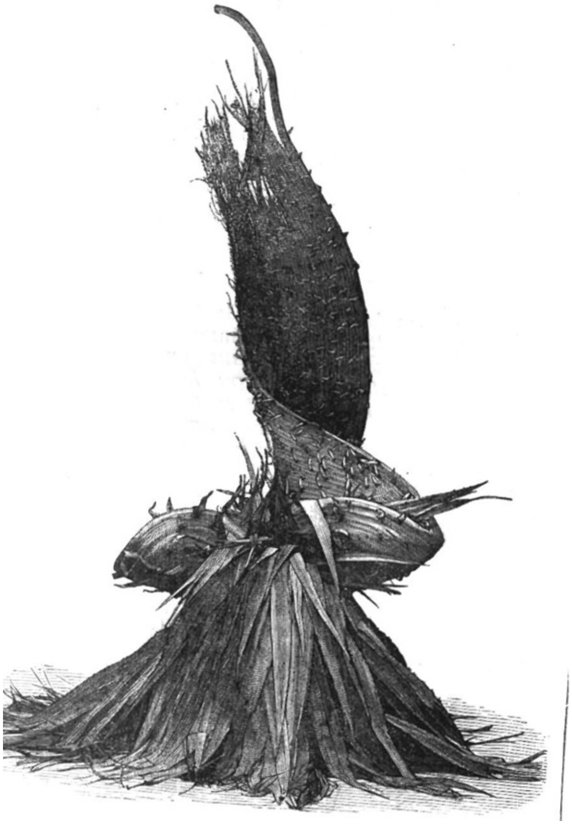
stem, when it was scarcely 1 foot high, vestiges being still visible that it was bent towards the right and kept in this forced position by some of the leaves. The upward growth being thus checked, numerous adventitious buds made their appearance on the injured organ, coalesced from the very outset, and formed by their subsequent growth the fasciated stem, the twisting resulting from the unequal rate of development of its component parts (Masters, "Veget. Teratology," 18).



Fasciation is likely to be not at all uncommon in *Fourcroya* and other allied plants, though I know of but three cases in the former, and never heard of any in *Agave*. In 1854 a very curious case of this kind was for several months the cause of considerable excitement among the good people of Caracas; it is described in the newspapers of the time as having been likewise twisted in the shape of a gigantic S. Another instance came under my notice in 1876, and was described in the *Journal of Botany* of that year, p. 180.

Caracas, April 19. A. ERNST.

NOTES.

THE following were elected Foreign Members of the Royal Society, on Thursday, May 31: Prof. Edmond Becquerel, of Paris, distinguished for his researches on the effects of light on bodies, especially with reference to phosphorescence; Prof. Hermann Kopp, of Heidelberg, for his researches on atomic volumes and boiling-points; Prof. Eduard F. W. Pflüger, of Bonn, for his researches in physiology, especially in relation to irritability of nerves, respiration, and animal heat; and Prof. Julius Sachs, of Würzburg, for his researches in botany, especially vegetable physiology.

THE Board of Visitors made their annual inspection of the Royal Observatory at Greenwich on Saturday last.

THE Vienna Correspondent of the *Times* announces that, in pursuance of a resolution passed at a recent meeting, the Vienna geologists will invite the International Geologists' Congress, which will assemble in London in September, to hold its next meeting in Vienna.

AT a recent meeting of the Victoria Royal Society, the President (Prof. Kerrot) announced that the first meeting of the Australian Association for the Advancement of Science would be held at Sydney, beginning September 4, the second at Melbourne, the third at Adelaide. The proposal that Victoria should join in the movement was favourably received, but at that meeting no action was taken in the matter.

IT will be seen from our list of the additions to the Zoological Society's Gardens during the past week that a living specimen of Pallas's sand grouse (*Syrrhaptes paradoxus*), the new visitor from Central Asia, has been presented by Mr. H. Hewart Crane, of Berwick-on-Tweed. It was captured at that place on May 25.

THE Tartar sand grouse seems to have appeared in Denmark and Scandinavia before making its appearance here. In the Island of Bornholm, in the Baltic, large flocks, numbering many hundreds, were seen early in May, some being shot, others captured alive. A few days later, birds were seen in various parts of Denmark and Sweden. In Norway a flock of birds was seen at Lister, on the extreme west coast, on May 12, and two were shot, a male and female. Their crops were full of tiny black seeds unknown to that country, whilst the eggs in the hen were far developed. During the immigration in 1863 these birds were seen as far north as Nordfjord. In that year, too, many nested on the west coast of Jutland, where the soil is sandy, but they were all gathered by the fishermen.

PROF. A. GRAHAM BELL, who is now on his way to England, will shortly appear before the Royal Commission engaged in making inquiry as to the best methods of caring for and educating deaf-mutes. In announcing this fact, *Science* reminds its readers that several years ago Prof. Bell presented a paper, at a meeting of the National Academy of Sciences, on the formation, through the intermarriage of deaf-mutes, of a deaf variety of the human race, and gave some important statistics to show that a much larger percentage of the children of deaf parents are deaf than of those whose parents possess the sense of hearing. This paper attracted wide attention, and gave rise to very interesting discussions both in America and elsewhere. The Royal Commission has requested Prof. Bell to lay before it the results of his subsequent investigations and studies upon this branch of the subject, and he has devoted much time to the preparation of facts and figures in regard to it. He will also give the Commission the result of his studies of other divisions of the subject.

ACCORDING to *Allen's Indian Mail*, Mr. Barrington Browne, the geologist sent by the Secretary of State to examine the Burma Ruby Mines, has left Simla for England. He has, it is understood, handed in to the Government of India his report on the mineral wealth of Upper Burma.

THE hydrographic survey of Canadian waters, which has already taken about five years, is now nearly half done. Commander Boulton is hard at work in Georgian Bay, one of the most dangerous of inland waters in Canada, and it is said that the survey will be extended to Lake Superior.

FROM September 15 to October 25 there will be in Vienna an International Exhibition of Amateurs' Photographs and Photographic Apparatus. The Exhibition is being organized by the Vienna Club of Amateur Photographers, and will be held in honour of what is called "the Jubilee" of the Emperor Francis Joseph. It will include every branch of art and manufacture connected with photography. The Club's Daguerre Medal and certificates of honourable mention will be awarded to the best exhibit or exhibits in each class of photography, photographic apparatus, lenses, &c., provided the jury deem any exhibit or exhibits of sufficient merit. From the decision of the jury there will be no appeal. The Club, as far as its funds permit, will purchase the most interesting exhibits. Amateurs have not to pay hire for the space allotted to them. On application they can obtain the use of frames free of charge. A catalogue will be published, possibly with illustrations of the most interesting objects. According to the statutes of the I. and R. Austrian Museum for Arts and Manufactures, admission will be free five days a week.

THE current number of the *Board of Trade Journal* contains an abstract of the third volume of the Reports of the Royal Commission appointed by the King of the Belgians in April 1886 to inquire into the condition of labour in Belgium. The volume contains the propositions of the various sections of the Commission with respect to the different questions relating to the condition of the working classes, and also the final conclusions of the whole Commission. The third section of the Commission dealt with technical education, and the conclusions adopted by the whole Commission are as follow:—(1) They recommend that in the technical schools practical lectures be given on the application of art and science to industry. (2) Manual dexterity should be cultivated in the elementary schools. At the industrial schools the theoretical application of science to industry should be taught. (3) The Government should limit its action to providing grants for these schools, and fixing the position each school is to occupy in a proper gradation of educational institutions. (4) The local bodies should introduce manual exercises into the primary schools, and found more technical schools and schools of design and modelling. (5) The aid of the Government and the communes should be given conditionally on a minimum age being fixed for apprentices, and on a test examination at entrance being made necessary. (6) The Government should aid in increasing the facilities by which workmen would get technical instruction in subjects suited to their occupation.

M. COUMBARY, Director of the Imperial Meteorological Observatory at Constantinople, has published a pamphlet upon the climatology of that place, deduced from twenty years' observations (1868–87). Hitherto, what has been known about its climate is mostly owing to observations and summaries contained in the periodicals of the French Meteorological Society, commencing with the year 1847, and to the telegraphic reports in the French *Bulletin International*. M. Coumbary issued a monthly Bulletin in 1869, containing observations made at several places in the Ottoman Empire, but this was discontinued in 1874. The present discussion shows that the mean temperature is 57°·7. The absolute maximum was 99°·1 in August 1880, and the minimum 17°·2 in January 1869, giving a range of 82°. The French observations show greater extremes, but this is probably owing to imperfect protection from radiation in earlier years. The greatest daily ranges were 37°·8 in December, and 36° in March; in other months the range has not exceeded 27°. The extremes are of course modified by the influence of the Black Sea; it is not unusual for the thermometer at Odessa, for instance, to indicate 24° or so below the temperature at Constantinople. The mean annual rainfall is 28 inches, and the days of rain average 84. Snow falls on 14 days, on an average. About three years ago the Sultan showed his interest in the subject by the establishment of a second observatory in his palace at Yildiz. Both institutions are furnished with the best instruments.

WE have received the twelfth Annual Report on the Meteorology of India, containing the observations taken in 1886. It deals with nearly the same area as last year, and is published in the form previously adopted. For fullness and thoroughness in the discussion of results, it remains unexcelled, and it includes, as before, monthly charts showing very clearly the mean pressure and temperature, and the resultant winds over the vast region embraced in the Report. Among the more important additions are an observatory at Mandalay, where the transitions of the seasons are said to be sudden, and earthquakes not infrequent, and a station on the Great Coco Island, in the Bay of Bengal, an island which is said to be destitute of drinking-water. The results show that in every month of the year 1886 the mean "equilibrium" temperature of insolation throughout India was below the average of the last ten or eleven years by amounts varying from 0°·8 to 1°·8. The annual variations for the past seven years show a fairly well-marked periodicity, and suggest a slight variation in the sun's radiating power. The rainfall is represented by 500 stations (14 more than in the previous Report), and was characterized by several striking features. On the mean of the whole area there was an excess of 2·77 inches as compared with the averages for previous years.

THREE important new chlorine compounds of titanium have been obtained by Drs. Koenig and von der Pfordten, of Munich. They may be considered as chlorine derivatives of titanic acid, $Ti(OH)_4$, and form the only complete series of such compounds with which we are as yet acquainted in the whole range of inorganic chemistry. They are formed by the replacement of the hydroxyl groups by chlorine, and have therefore the following constitutions: $TiCl(OH)_3$, $TiCl_2(OH)_2$, and $TiCl_3OH$. The well-known tetrachloride of titanium, $TiCl_4$, thus completes the series, and in reality formed the starting-point from which the three intermediate compounds were successively prepared. Trichloride of titanic acid, $TiCl_3OH$, was obtained by the careful addition of concentrated hydrochloric acid to the tetrachloride in such proportion that the amount of water present in the strong acid was that required by the following equation: $TiCl_4 + H_2O = TiCl_3OH + HCl$. The reaction is very violent, and a solid mass of the trichloride was almost instantly formed and considerably distended by the escaping hydrochloric acid gas. The substance was at once transferred to the vacuum of an air-pump, and after a few days was found to be entirely freed from last traces of the gas. The solid trichloride thus formed is extremely deliquescent, and readily dissolves with considerable hissing in water and alcohol, the aqueous solution being remarkably stable. The dichloride, $TiCl_2(OH)_2$, was prepared by addition of a slight excess of strong hydrochloric acid to the tetrachloride, and also by placing the latter compound in a small quantity of ice-cold water. In the latter case, the drops of $TiCl_4$ are at first decomposed with loud hissing, which, as the drops continue to fall, gradually diminishes until a point is reached when a drop floats on the surface and remains unattacked. This last drop is then removed, and the clear solution evaporated *in vacuo*, when the dichloride is left as a compact deliquescent solid. The monochloride, $TiCl(OH)_3$, is the product of the action of moist air upon the tri- and di-chlorides, hydrochloric acid gas being at the same time evolved, in accordance with the following equations:

$$TiCl_3OH + 2H_2O = TiCl(OH)_3 + 2HCl,$$
$$TiCl_2(OH)_2 + H_2O = TiCl(OH)_3 + HCl.$$

The monochloride thus formed remains stable in air; on evaporation over oil of vitriol it is obtained as a white solid, crystallizing apparently in the hexagonal system, and very difficultly soluble in water. In conclusion, the Munich chemists show very conclusively that these new substances are true compounds and no mere mixtures; and, it may be added, the analyses, which must of necessity have been extremely difficult, are quite satisfactory.

THE British Consul at Mogador, in Morocco, in his last report notes, in connection with the fisheries of the year, a curious phenomenon. A fish locally called the "tasargelt" (*Temnodon saltator*) has appeared in vast shoals, having left the waters unvisited, save a few stray specimens, since 1859. It weighs from six to eight pounds, and has flesh of rich flavour, of which the natives never seem to tire. It first appeared in large numbers early in September, and from that time till December the fishermen were busily occupied taking them. The mode of capture is rather primitive. A piece of white rag or a strip of the skin of the tasargelt itself is fastened to a large and often barbless hook, which in turn is tied by strong brass wire to the end of a short bamboo rod. When the bait is drawn rapidly through the water, the fish rises quickly to it. The tasargelt was accompanied by shoals of the "azlimzah" or "maigre," a fish which frequently weighs as much as sixty or seventy pounds. The presence of these voracious fish ruined the ordinary hook-and-line industry. Though shoals of bonito appeared, only one small specimen was taken, for they refused to take any bait. The sardine fishery was also a failure.

THE British Consul at Varna, in the course of his Report on the trade of his district for the past year, refers to the vineyards, and says that, though the Phylloxera has not made its appearance in these regions, there is a kind of insect pest which he believes to be peculiar to the Varna vineyards. Its ravages have been confined to certain areas, and the vine it attacks is disabled only for the year of the attack, and only to the extent of the particular shoots which it may lop off. The local name of the insect is *Kara terzi*, or "the black tailor," an appellation which is supposed to indicate its appearance and habits. In the absence of local entomologists, Mr. Brophy describes this new pest as an adipose black beetle, somewhat resembling the ordinary dung-beetle, measuring, when adult, about three-fourths of an inch in body-length, and furnished with a short pair of shears; with these, in the mornings of April and May, it cuts through and off the young vine-shoots, which it leaves on the ground until they are parched by the sun, when it drags them into the recesses of its deep and tunnelled hole, generally situated at the foot of the plant attacked. The vineyards chiefly affected are situated on ground near the sea-shore, whence the insect makes its way inland; "and as the *Kara terzi* does not appear to have obtruded itself upon the notice of the vine-growers by its obnoxious habits until comparatively recently, it may perhaps be fair to suppose that the temptation of green and succulent vine-shoots may, in the course of generations, have perverted the present race into abandoning the more innocent diet which satisfied their ancestors, and which, when the vine-shoots have passed the tender stage, has still to suffice those of the present day." Mr. Brophy says that if the circumstances of insect-life here related prove in any way new or interesting, it would not be difficult to procure, in summer, specimens of this beetle for inspection by qualified entomologists.

AT two successive meetings of the Oriental Society of Pekin, Prof. Russell, of the Tung-Wen-Kwan, or Foreign Language College, read two papers on subjects connected with Chinese astronomy. In the first he described the instruments in the Pekin Observatory, which were constructed by the order of the great Emperor Kanghi about 1670. In the course of the discussion which followed, it was stated that this prince was very fond of mathematics and astronomy, and that the present Emperor was credited with similar inclinations. Kanghi was sixteen when he ordered the instruments to be constructed. The clepsydra used in the Observatory, it was stated, consisted of five cisterns, and was used for observing the time of eclipses, being put in order for this purpose three days before each eclipse. One of the instruments is usually said to be of European design and to have been presented by Louis XIV. The inscription or emblem on it has been carefully removed, and its place supplied by a piece of bronze matching the metal of the instrument. In some Chinese books it is said that this instrument was manfactured by a foreign priest. Verbiest, a Jesuit of the time of Kanghi, pointed out a mistake in the Chinese calendar; the matter was referred by the Emperor to the Board of Astronomy, and Verbiest's accuracy was acknowledged. From that time a Jesuit missionary occupied the post of Vice-President of the Board down to 1828.

THE second paper, also by Prof. Russell, was on early Chinese eclipse calculations, and entailed vast labour in re-calculating. It appears from the investigations of the learned Professor that the earliest calculations of a solar eclipse and also of a lunar eclipse which have been preserved were made by the Chinese. The discussion turned largely on the historical value of the Chinese classics with regard to these astronomical observations, and the attention with which the Chinese from the earliest times have studied astronomy. Passages found in one or other of the few works which survived the destruction of the books before the Christian era bear witness to the devotion with which the stars were studied in China at that remote epoch. The full text of these two interesting papers will be awaited with interest.

AT a recent meeting of the Scientific Society of Upsala, Dr. C. Aurivillius read a paper on the skeleton of the so-called Swedenborg whale (*Eubalena svedenborgii*, Lillj.), discovered last November in the province of Halland, in a layer of marl 50 feet above the sea. Remains of this species of whale have only been found once before, viz. early last century, when some parts of one were discovered in the province of Western Gothland, 330 feet above the sea, and 70 miles inland. It was at first believed that they were the bones of some giant, but it is said that Swedenborg discovered their true nature. The skeleton has been presented to the Upsala Museum.

IN the Proceedings of the Moscow Archæological Society, there is a most interesting communication by M. Anutchin, on the use of sledges, boats, and horses, or saddles, at the burials of various races. He shows that until the seventeenth century the Slavonians used sledges even in summer for the transport of the corpse to the grave. The Samoyedes and Ostyaks, and many Russian peasants of Northern Russia, still follow this custom. The boat was used by the Normans, the Old Germans, and generally by races inhabiting the shores of lakes. Many tribes of North America used to bury their dead together with a horse, or transported the dead to the grave on a horse. It is remarkable that the same custom is found among the Lithuanians, who, even in the sixteenth century, put their dead on a saddle. The sledge, the boat, and the horse, or saddle, were obviously intended to aid the dead in passing into another world, and in visiting kinsfolk there.

AN ancient canoe has been found in the Tunhövd Fjord, in Valders, in South Central Norway. It has been hollowed out by means of red-hot stones, and is 4½ metres long and 80 centimetres broad. It is in fair condition. The find is of interest, as no other primitive vessel of the kind has been found inland in Norway. The boat will be sent to the Museum at Christiania.

Science says that a citizen of the United States, who has long resided abroad, proposes to give to the Smithsonian Institution a large collection of armour from the Middle Ages—some of it connected with most famous historical names—including horse-armour, helmets, swords, and all the paraphernalia of ancient warfare. These objects, numbering about five thousand, have been brought together at great expense, and the collection is one of the most valuable of the kind in the world. The condition of the presentation is that the Smithsonian Institution shall furnish a fire-proof building for the collection.

AT the last meeting of the Ceylon Branch of the Royal Asiatic Society, a lengthy paper was read by Mr. P. Ramanathan, the leading Tamil of Colombo, on the ethnology of the Moors of Ceylon. These Moors, or Moormen, are usually classified in the island as a race by themselves, apart from the Tamils, Singhalese, and other races inhabiting it, but Mr. Ramanathan came to the conclusion that the history, social customs, physical features, and language of the Moors, class them as Tamils who were converted to Mohammedanism in India before their migration to Ceylon. He does not think there is any difference between the two classes of "Ceylon Moors" and "Coast Moors" in race or in the history of their conversion, the difference drawn by the members of these classes between themselves being due to a break in the course of immigration from India caused by the persecution of Mohammedans by the Dutch when the latter had possession of Ceylon. He pointed out that it was impossible that the very large number of Moors now existing in India and Ceylon could be, as is popularly supposed, descendants of the small bands of Arab and Moorish merchants and refugees who visited India in early times. He thought that only about 5 per cent. of the existing Moors could owe their origin to these immigrants. The paper, which was a very long and exhaustive one, evidently could not be fully appreciated by those who merely heard it read; but in the subsequent discussion most of the speakers appeared to think that Mr. Ramanathan's conclusion was not satisfactorily established. It was argued that in several directions—especially in regard to the shapes of the skulls—the facts were insufficient, and that at best Mr. Ramanathan's evidence for his thesis was only secondary. The value of the paper as a starting-point for further investigation was generally acknowledged.

THE *Comptes rendus* of the French Academy of Sciences for May 14, publishes some interesting remarks on the vital statistics of Germany, by M. Ch. Grad, author of a work on the power and resources of the German people. The population of the empire increased from 40,816,000 in 1870 to 46,855,000 in 1885; that is, an increase of over 6,000,000 in fifteen years, or at the rate of 1 per cent. per annum. Compared with this the increase in France has been extremely slow, less than 5,000,000 for the period of fifty years between 1831 and 1881 (32,560,000 and 37,321,000 respectively), or at the rate of only 0·3 per cent. per annum, with a constant tendency to diminish. During the last fifteen years the excess of births over deaths has been seven times greater in Germany than in France. The contrast becomes greater when it is added that, while few Frenchmen emigrate, as many as 4,000,000 Germans have removed to the United States since 1820. In 1880, the population of the empire included 2,860,000 of Polish speech, 300,000 of French, 150,000 of Danish, 150,000 of Lettish, 137,000 of Wendish, and 34,000 of Checkish or Bohemian. But on the other hand there are at present in Europe over 60,000,000 of Germanic speech, if the 8,000,000 Dutch and Flemish speaking inhabitants of the Low Countries be included. Altogether, the Teutonic nationality has doubled in Europe since 1840. But the increase has been almost entirely in the urban population, which advanced from 14,790,000 in 1871 to 18,720,000 in 1880, while that of the rural districts remained almost stationary (26,219,000 and 26,513,000 respectively). For the whole empire the density of the population is about 86 per square kilometre as compared with 72 in France.

SOME figures with reference to alcoholism and criminality were recently communicated to the French Academy of Medicine by M. Marambat. They referred to an examination of 3000 condemned persons; and it appears that 79 per cent. of the vagabonds and mendicants were drunkards, 50 to 57 per cent. of assassins and incendiaries, 53 per cent. of persons convicted of outrages on morals, 71 per cent. of thieves, sharpers, &c. In acts of violence against the person, 88 per cent. were found to be drunkards; against property, 77 per cent. Among youths under twenty, drunkards were nearly as numerous as among adults, the difference being only 10 per cent. Of these youths, 64 per cent. were addicted to drinking. An examination of the departments showed the largest number of drunkards from the regions where spirits are most largely consumed.

A FIFTH edition of the late Prof. Balfour Stewart's "Elementary Treatise on Heat" (Clarendon Press) has just been issued. Prof. Tait undertook to read the proofs, but found that there was little for him to do. "Prof. Balfour Stewart had himself," he says, "given *imprimatur* to all but the last six sheets; and for these I was furnished with 'copy' (excepting four pages) fully revised and initialed by him. The book is published, therefore, precisely in the form in which its author intended it to appear."

THE February and May numbers of the Journal of the Anthropological Institute are of more than usual interest. Among the contents are the following papers: on an ancient British settlement excavated near Rushmore, Salisbury, by General Pitt-Rivers; on the stature of the older races of England, as estimated from the long bones, by Dr. John Beddoe; the Lower Congo, a sociological study, by Mr. R. C. Phillips; the origin and primitive seat of the Aryans, by Canon Isaac Taylor; the Maori and the Moa, by Mr. E. Tregear; on the shell money of New Britain, by the Rev. Benjamin Danks; on tattooing, by Miss A. W. Buckland; on the evolution of a characteristic pattern on the shafts of arrows from the Solomon Islands, by Mr. Henry Balfour; on the occurrence of stone mortars in the ancient (Pliocene?) river-gravels of Butte County, California, by Mr. Sydney B. J. Skertchly; and the address delivered by Mr. F. Galton, as President, at the anniversary meeting of the Institute.

MESSRS. JOHN WILEY AND SONS, the American publishers, have in preparation a translation of Rosenbusch's "Microscopical Physiography of Minerals and Rocks," by Joseph P. Iddings, of the United States Geological Survey.

LAST week we referred to the edition of Barlow's Tables of Reciprocals issued by Taylor and Walton in 1840. The work has also been issued by E. and F. N. Spon. With reference to our note on this subject, Mr. V. B. Sprague and Mr. George King call attention to the "Table of the Reciprocals of Numbers from 1 to 100,000, with their differences, by which the reciprocals of numbers may be obtained up to 10,000,000, by Lieut.-Colonel W. H. Oakes, A.I.A. London: Charles and Edwin Layton, 150 Fleet Street, 1865." This table gives to seven significant figures the reciprocals of all numbers from 10,000 up to 99,999; and by means of the proportional parts the reciprocals of all numbers up to 10,000,000 may be obtained. Mr. Sprague points out that reciprocals can also be obtained with great facility by the use of Thomas's arithmometer; and this, he thinks, is the most convenient method when the number contains eight digits, and it is desired that the reciprocal should contain the same, or a larger number, of significant figures.

A RUSSIAN translation of Prof. Everett's "Units and Physical Constants" has just been published at St. Petersburg. This is the fifth language into which the work has been translated, the other four being Dutch, French, Polish, and German. The German edition was long delayed by the compiling of additional experimental data, and only made its appearance a month ago.

THE New York State Museum of Natural History has issued a useful Bulletin (No. 3) on "Building-Stone in the State of New York." The author is Mr. John C. Smock.

THE additions to the Zoological Society's Gardens during the past week include a Pudu Deer (*Pudu humilis* ♀) from Chili, presented by Mr. G. E. Pugh Cook; two —— Squirrels (*Sciurus* ——) from Demerara, presented by Mr. R. Forrester Daly; a Blue and Yellow Macaw (*Ara ararauna*) from South America, presented by Mrs. Alfred Palmer; a Pallas's Sand Grouse (*Syrrhaptes paradoxus*) from Berwick-on-Tweed, presented by Mr. H. Hewart Crane; two Australian Waxbills (*Estrelda temporalis*); seven Spotted-sided Finches (*Amadina lathami*) from Australia, presented by Mr. David S. Hodge; a Nose-crested Iguana (*Iguana rhinolopha*) from St. Lucia, West Indies, presented by Dr. T. Dennehy; a Tent Tortoise (*Testudo tentoria*), a Fisk's Tortoise (*Testudo fiski*) from Cradock, Cape Colony, a Dwarf Chameleon (*Chamæleon pumilus*), a Purplish Gecko (*Phyllodactylus porphyreus*), a Hoary Snake (*Coronella cana*), three Narrow-headed Toads (*Bufo angusticeps*), five Gray's Frogs (*Rana grayi*) from South Africa, presented by the Rev. G. H. R. Fisk; two Tigers (*Felis tigris*) from India, two Puff Adders (*Vipera arietans*) from South Africa, deposited; a Long-billed Butcher Crow (*Barita destructor*) from New Holland, received in exchange; two North African Jackals (*Canis anthus*), born in the Gardens.

ASTRONOMICAL PHENOMENA FOR THE WEEK 1888 JUNE 10–16.

(FOR the reckoning of time the civil day, commencing at Greenwich mean midnight, counting the hours on to 24, is here employed.)

At Greenwich on June 10

Sun rises, 3h. 46m.; souths, 11h. 59m. 15·5s.; sets, 20h. 13m.: right asc. on meridian, 5h. 16·3m.; decl. 23° 4′ N. Sidereal Time at Sunset, 13h. 31m.

Moon (New on June 9, 17h.) rises, 4h. 35m.; souths, 12h. 40m.; sets, 20h. 49m.: right asc. on meridian, 5h. 57·3m.; decl. 20° 45′ N.

Planet.	Rises. h. m.	Souths. h. m.	Sets. h. m.	Right asc. and declination on meridian. h. m.	 ° ′
Mercury..	5 25	13 46	22 7	7 3·0	24 0 N.
Venus.....	3 18	11 22	19 26	4 39·5	21 45 N.
Mars......	14 0	19 34	1 8*	12 52·2	5 45 S.
Jupiter....	18 7	22 29	2 51*	15 48·4	19 3 S.
Saturn....	7 15	15 7	22 59	8 24·9	19 55 N.
Uranus...	13 51	19 31	1 11*	12 49·5	4 35 S.
Neptune..	2 53	10 38	18 23	3 54·9	18 41 N.

* Indicates that the setting is that of the following morning.

June.	h.	
11	21	Mercury in conjunction with and 2° 29′ north of the Moon.
12	2	Mercury at greatest elongation from the Sun 24° east.
13	8	Saturn in conjunction with and 0° 20′ north of the Moon.

Variable Stars.

Star.	R.A. h. m.	Decl. ° ′		h. m.	
U Cephei	0 52·4	81 16 N.	June 10,	23 55	*m*
			,, 15,	23 35	*m*
S Cassiopeiæ	1 11·4	72 1 N.	,, 16,		*M*
η Geminorum	6 8·1	22 32 N.	,, 15,		*M*
V Geminorum	7 16·9	13 18 N.	,, 11,		*M*
U Monocerotis	7 25·5	9 33 S.	,, 16,		*M*
S Geminorum	7 36·3	23 43 N.	,, 14,		*M*
δ Libræ	14 55·0	8 4 S.	,, 15,	2 54	*m*
U Ophiuchi	17 10·9	1 20 N.	,, 13,	0 34	*m*
W Sagittarii	17 57·9	29 35 S.	,, 12,	2 0	*M*
β Lyræ	18 46·0	33 14 N.	,, 16,	1 0	*m*
η Aquilæ	19 46·8	0 43 N.	,, 12,	21 0	*M*
S Sagittæ	19 50·9	16 20 N.	,, 10,	22 0	*m*
			,, 13,	22 0	*M*
X Cygni	20 39·0	35 11 N.	,, 12,	21 0	*M*
T Vulpeculæ	20 46·7	27 50 N.	,, 10,	22 0	*m*
R Vulpeculæ	20 59·4	23 23 N.	,, 16,		*m*

M signifies maximum; *m* minimum.

Meteor-Showers.

	R.A.	Decl.	
Near α Vulpeculæ	286°	24° N.	Rather slow.
,, α Cephei	316	60 N.	Swift, streaks.
,, β Piscium	345	1 N.	June 11–13. Very swift.

GEOGRAPHICAL NOTES.

MAJOR HOBDAY reports of the operations in Upper Burma that during the season of 1887–88, the whole of the Yaw country has been thoroughly surveyed by surveyors attached to the various columns converging on Gangaw. On the north a connection has been made with the work executed by Colonel Woodthorpe's party last year in the Kubo Valley. A good deal of the geography of the Schwele River and the Mohlaing district has also been obtained. The extent of surveying that has been done by the surveyors who accompanied the column from Bhamo to Mogdung and thence by the Jade Mines and Endawgyi Lake to Katha, on the Irrawaddy, is not yet known, as reports have not yet been received. In the Southern Shan States a party under Lieut. Jackson, R.E., has carried on survey operations in continuation of last year's work from Fort Stedman to Pekon, in the Saga Valley, thence *viâ* Maukme, and Moné to Maing-pan and the Salween River, where the Siamese mission under Mr. Archer was met. Returning to Moné, they carried the survey through Legya and Bansan to Maing-ye. In the Northern Shan States a sub-surveyor has carried our surveys from Thibaw to Namsan, and across the Myit-nge or Namtu River to Theinni, on the Salween, and thence *viâ* Maing-yaw to Manse and Maing-ye, thus effecting a junction with Lieut. Jackson's work. Major Hobday himself has extended the triangulation from Kyan Nyat to Bhamo, of which the position is thus determined, and a basis provided for the surveys in the direction of Mogaung. It is hoped that the triangulation executed by this party will be connected during this season with that of the surveys in Lower Burma. In addition to the work done by members of this department, many reconnaissances have been executed by regimental and other military officers and the results given to Major Hobday for incorporation in his sheets.

WE are glad to notice that Signor Guido Cora's *Cosmos* now appears more regularly and frequently than formerly. The last number contains a detailed account of recent Danish expeditions in Greenland.

THE whole of the new number of the *Deutsche Geographische Blätter* is occupied with the narrative of J. G. Kohl's American studies, the results of journeys made thirty years ago in North America.

THE principal paper in the new part of the *Zeitschrift* of the Berlin Geographical Society is an elaborate examination of Sir John Mandeville's writings by Dr. A. Bovenschen, in which the author comes to conclusions decidedly unfavourable to Sir John's trustworthiness. Dr. G. Hellmann contributes an important paper on the rainfall of the Iberian peninsula. In the *Verhandlungen* of the same Society we find papers on the geography and ethnography of Southern Mesopotamia, by Dr. B. Moritz, and on the Isthmus of Corinth, by Dr. A. Philippson.

IT may be useful to state that in No. 1 of the third series of the *Bulletin* of the Egyptian Geographical Society is a connected account in French, by Dr. O. Lenz, of his last journey across Africa.

THE June number of the Journal of the Royal Geographical Society contains the first part of Mr. D. W. Freshfield's paper on the Caucasus; it deals with Suanetia, and is illustrated with maps and diagrams. The same number contains Mr. Woodford's paper on his explorations in the Solomon Islands.

TWO Swedish colonists, MM. Valdau and Knutson, have recently done some interesting geographical work in the Cameroons territory. M. Valdau has explored the northern slopes of the range, which are very thickly peopled by the Bomboko tribe. The main chain of the mountains does not extend as far as 4° 30′ N. lat., as the highest point attained by the traveller, about 4° 28′ N. lat., only measured 2850 feet. M. Knutson has explored the River Memeh, which, he ascertained, empties itself into the sea a little to the south of Rumbi. The river is navigable for thirty miles, to the Düben falls, which are 100 feet in height.